WHAT IS CLAIMED IS:

1. A method of providing a sub-circuit representation of a non-linear device in a MOS circuit for use in simulating the operation of the circuit, comprising:

receiving data characterizing the response of the non-linear device;

constructing a sub-circuit to represent the non-linear device, said sub-circuit having one or more adjustable parameters;

simultaneously optimizing a plurality of the subcircuit's characterizations of the device with respect to the data by adjusting at least one of the parameters, wherein the characterizations include a DC characterization and a high frequency characterization.

2. The method of claim 1, wherein said data includes the DC, low frequency, and high frequency response characteristics of the device.

3. The method of claim 2, wherein said high frequency response characteristics are measured as S parameters.

4. The method of claim 1, wherein said non-linear device is a MOSFET.

5. The method of claim 4, wherein said sub-circuit comprises

a MOSFET having a plurality of adjustable intrinsic parameters; and

a plurality of elements external to the MOSFET, wherein one or more of the external elements have an adjustable parameter.

6. The method of claim 1, wherein the high frequency characterization includes the response characteristics of the device at frequencies above 10^9 hertz.

7. The method of claim 1, wherein the characterizations further include a noise characterization.

8. The method of claim 7, wherein said data includes the DC, low frequency, and high frequency response characteristics and noise data of the device .

9. The method of claim 8, wherein said high frequency response characteristics are measured as S parameters.

10. The method of claim 7, wherein said non-linear device is a MOSFET.

11. The method of claim 10, wherein said sub-circuit comprises

a MOSFET having a plurality of adjustable intrinsic parameters; and

a plurality of elements external to the MOSFET, wherein one or more of the external elements have an adjustable parameter.

12. The method of claim 7, wherein the high frequency characterization includes the response characteristics of the device at frequencies above 10^9 hertz.

13. A method of constructing a sub-circuit representation of a non-linear device in a MOS circuit for use in simulating the operation of the circuit, comprising:

selecting a simulation model having one or more internal parameters for modelling the non-linear device;

receiving response characteristics of the non-linear device, said response characteristics including DC and high frequency device response characteristics;

replacing the non-linear device with a subcircuit comprising:

a plurality of external elements each having one or more parameters; and

the non-linear device, wherein at least one of the internal parameters of the non-linear device within the subcircuit have been adjusted to compensate for the introduction of the external elements;

setting the internal parameters of the non-linear device and sub-circuit external element parameters based upon the DC response characteristics;

adjusting the internal parameters of the non-linear device and sub-circuit external element parameters based upon the high frequency response characteristics.

14. The method of claim 13, wherein the non-linear device is a MOSFET.

15. The method of claim 13, wherein the high frequency characterization includes the response characteristics of the device at frequencies above 10^9 hertz.

16. The method of claim 13, wherein the simulation model is a SPICE simulation.

17. The method of claim 13, wherein the high frequency device response characteristics are the measured S parameters of the device.

18. The method of claim 13, wherein the subcircuit is derived in response to user input.

19. The method of claim 13, wherein the external elements include source and drain resistances.

20. The method of claim 19, wherein at least one of the internal model parameters which have been adjusted to compensated for the introduction of external elements correspond to source and drain resistance parameters.

21. The method of claim 13, wherein setting the internal parameters includes adjusting the transconductance and the drain to source conductance of the non-linear device.

22. The method of claim 14, wherein the external elements include a diode connected the source and a diode connected the drain of the non-linear device.

23. The method of claim 23, wherein setting the internal parameters of the non-linear device includes setting the area and perimeter coefficients of the non-linear device to zero.

24. The method of claim 13, further comprising:

simultaneously optimizing the subcircuit's DC characterization and high frequency characterization of the device with respect to the response characteristics by adjusting at least one of the internal parameters of the non-linear device and sub-circuit external element parameters.

25. A method of simulating the operation of a circuit, comprising:

providing a simulation model of the circuit;

selecting a set of frequency points;

simulating the response of the circuit for a subset of the frequency points using the simulation model, said subset comprising a first group and a distinct second group, wherein each frequency point of said first group lies between a pair of frequency points in said second group of frequency points;

interpolating the response of the circuit for the first group of frequency points from the simulated values of the second group of frequency points;

comparing the simulated response with the interpolated response for the first group of frequency points, wherein if the difference between the simulated value and the interpolated value of a first point in the first group exceeds a bound, an additional frequency point is added to the second group, the additional point lying between the same pair of frequency points in said second group as the first point;

iteratively repeating the interpolating and comparing until the difference between the simulated value and the interpolated value of each point in the first group do not exceeds the bound; and

determining the response of the circuit for frequency points not in the subset from the interpolated response.

26. The method of claim 25, wherein said response is interpolated and simulated in the Y response parameter representation.

27. The method of claim 25, wherein the interpolating is a cubic spline interpolation.

28. The method of claim 25, wherein the circuit is a sub-circuit representation of a non-linear device.

29. The method of claim 28, wherein the non-linear device is a MOSFET.

30. The method of claim 29, wherein the set of frequency points includes frequencies greater than 10^9 hertz.

31. The method of claim 30, wherein the number of elements in the set of frequency points is larger than the number of elements in the subset of frequency points by more than a factor of ten.

32. A method of graphically presenting the parameter sensitivity of a sub-circuit representation of a non-linear device, comprising:

selecting a model of the sub-circuit dependent upon a plurality of model specific parameters;

selecting from the model specific parameters a set of input variables to be presented;

selecting a simulation target set to display, wherein the elements of the target set are derivable from the response characteristics of the sub-circuit as determined by the model; and

dynamically providing a graphic representation of a simulation target set upon based the values of said input parameters chosen from said parameter range.

33. The method of claim 32, said dynamically providing a graphic representation comprises:

selecting values for the input variables; and

graphically displaying the graphic representation of the simulation target set for the selected values of the input variables.

34. The method of claim 33, additionally comprising specifying the parameter range of the input variables.

35. The method of claim 33, additionally comprising specifying the graphic properties of the graphic representation.

36. The method of claim 33, wherein the elements of the simulation target set are calculable from the S parameters of the sub-circuit as determined by the model.

37. The method of claim 36, wherein the elements of the simulation target set are additionally calculable from the DC behavior of the sub-circuit as determined by the model.

38. The method of claim 33, wherein the elements of the simulation target set are selectable from the DC characterization, the high frequency characterization, the gain, the power consumption, and the response parameters of the sub-circuit.

39. The method of claim 33, wherein the graphic representation is presented as a graphic user interface on a computer monitor, and wherein said input variable are presented as a sub-window of the graphic user interface.

40. The method of claim 33, additionally comprising:

supplying data values of the response characteristics of the non-linear device for the target set; and

providing a graphic representation of the data values concurrently with the model determined values of the target set upon the values of said input parameters chosen from said parameter range.

41. A method of simulating the dependence of non-linear device performance upon factor variations, comprising:

providing a typical model of a sub-circuit representation of a non-linear device, the typical model dependent upon a plurality of model specific parameters;

supplying statistical distributions of a first set of simulation targets;

calibrating a statistical distribution of a selected set of model specific parameters with the first set of simulation targets using the typical model; and

generating a statistical distribution of a selected second set of simulation targets from the calibrated statistical distributions using the typical model.

42. The method of claim 41, wherein said calibrating and generating are performed using a Monte Carlo technique.

43. The method of claim 41, wherein said statistical distributions of a first set of simulation targets are the mean and standard deviation of electrical test data.

44. The method of claim 41, wherein said second set of simulation targets are response parameters of the device.

45. The method of claim 44, wherein said second set of simulation targets includes the cut off frequency of the device.

46. The method of claim 44, wherein said second set of simulation targets includes the speed of the device.

47. The method of claim 44, wherein said second set of simulation targets includes the power consumption of the device.

48. The method of claim 44, further comprising specifying said response parameters, operating conditions of the device, and a range over which they are simulated.

49. The method of claim 44, further comprising specifying a simulation number.

50. The method of claim 44, wherein specifying said a range over which the response parameters and operating conditions are simulated includes specifying frequencies over 10^9 hertz.

51. The method of claim 41, wherein said non-linear device is a MOSFET.

52. The method of claim 41, further comprising generating a corner model subsequent to the generating of a statistical distribution.

53. A computer readable storage device embodying a program of instructions executable by a computer to perform a method of providing a sub-circuit representation of a non-linear device in a MOS circuit for use in simulating the operation of the circuit, said method comprising:

receiving data characterizing the response of the non-linear device;

constructing a sub-circuit to represent the non-linear device, said sub-circuit having one or more adjustable parameters;

simultaneously optimizing a plurality of the subcircuit's characterizations of the device with respect to the data by adjusting at least one of the parameters, wherein the characterizations include a DC characterization and a high frequency characterization.

54. The computer readable storage device of claim 53, wherein the characterizations further include a noise characterization.

55. The computer readable storage device of claim 53, wherein the high frequency characterization includes the response characteristics of the device at frequencies above 10^9 hertz.

56. A method for transmitting a program of instructions executable by a computer to perform a process of providing a sub-circuit representation of a non-linear device in a MOS circuit for use in simulating the operation of the circuit, said method comprising:

transmitting to a user a program of instructions; and

enabling the user device to perform, by means of such program, the following process:

receiving data characterizing the response of the non-linear device;

constructing a sub-circuit to represent the non-linear device, said sub-circuit having one or more adjustable parameters;

simultaneously optimizing a plurality of the subcircuit's characterizations of the device with respect to the data by adjusting at least one of the parameters, wherein the characterizations include a DC characterization and a high frequency characterization.

57. The method of claim 56, wherein the characterizations further include a noise characterization.

58. The method of claim 56, wherein the high frequency characterization includes the response characteristics of the device at frequencies above 10^9 hertz.

59. A computer readable storage device embodying a program of instructions executable by a computer to perform a method of constructing a sub-circuit representation of a non-linear device in a MOS circuit for use in simulating the operation of the circuit, said method comprising:

selecting a simulation model having one or more internal parameters for modelling the non-linear device;

receiving response characteristics of the non-linear device, said response characteristics including DC and high frequency device response characteristics;

replacing the non-linear device with a subcircuit comprising:

a plurality of external elements each having one or more parameters; and

the non-linear device, wherein at least one of the internal parameters of the non-linear device within the subcircuit have been adjusted to compensate for the introduction of the external elements;

setting the internal parameters of the non-linear device and sub-circuit external element parameters based upon the DC response characteristics;

adjusting the internal parameters of the non-linear device and sub-circuit external element parameters based upon the high frequency response characteristics.

60. The computer readable storage device of claim 59, wherein the high frequency characterization includes the response characteristics of the device at frequencies above 10^9 hertz.

61. The computer readable storage device of claim 59, the method further comprising:

simultaneously optimizing the subcircuit's DC characterization and high frequency characterization of the device with respect to the response characteristics by adjusting at least one of the internal parameters of the non-linear device and sub-circuit external element parameters.

62. A method for transmitting a program of instructions executable by a computer to perform a process of constructing a sub-circuit representation of a non-linear device in a MOS circuit for use in simulating the operation of the circuit, said method comprising:

transmitting to a user a program of instructions; and

enabling the user device to perform, by means of such program, the following process:

selecting a simulation model having one or more internal parameters for modelling the non-linear device;

receiving response characteristics of the non-linear device, said response characteristics including DC and high frequency device response characteristics;

replacing the non-linear device with a subcircuit comprising:

a plurality of external elements each having one or more parameters; and

the non-linear device, wherein at least one of the internal parameters of the non-linear device within the subcircuit have been adjusted to compensate for the introduction of the external elements;

setting the internal parameters of the non-linear device and sub-circuit external element parameters based upon the DC response characteristics;

adjusting the internal parameters of the non-linear device and sub-circuit external element parameters based upon the high frequency response characteristics.

63. The method of claim 62, wherein the high frequency characterization includes the response characteristics of the device at frequencies above 10^9 hertz.

64. The method of claim 62, the process further comprising:

simultaneously optimizing the subcircuit's DC characterization and high frequency characterization of the device with respect to the response characteristics by adjusting at least one of the internal parameters of the non-linear device and sub-circuit external element parameters.

65. A computer readable storage device embodying a program of instructions executable by a computer to perform a method of simulating the operation of a circuit, said method comprising:

providing a simulation model of the circuit;

selecting a set of frequency points;

simulating the response of the circuit for a subset of the frequency points using the simulation model, said subset comprising a first group and a distinct second group, wherein each frequency point of said first group lies between a pair of frequency points in said second group of frequency points;

interpolating the response of the circuit for the first group of frequency points from the simulated values of the second group of frequency points;

comparing the simulated response with the interpolated response for the first group of frequency points, wherein if the difference between the simulated value and the interpolated value of a first point in the first group exceeds a bound, an additional frequency point is added to the second group, the additional point lying between the same pair of frequency points in said second group as the first point;

iteratively repeating the interpolating and comparing until the difference between the simulated value and the interpolated value of each point in the first group do not exceeds the bound; and

determining the response of the circuit for frequency points not in the subset from the interpolated response.

66. The computer readable storage device of claim 65, wherein the circuit is a sub-circuit representation of a MOSFET.

67. A method for transmitting a program of instructions executable by a computer to perform a process of simulating the operation of a circuit, said method comprising:

transmitting to a user a program of instructions; and

enabling the user device to perform, by means of such program, the following process:

providing a simulation model of the circuit;

selecting a set of frequency points;

simulating the response of the circuit for a subset of the frequency points using the simulation model, said subset comprising a first group and a distinct second group, wherein each frequency point of said first group lies between a pair of frequency points in said second group of frequency points;

interpolating the response of the circuit for the first group of frequency points from the simulated values of the second group of frequency points;

comparing the simulated response with the interpolated response for the first group of frequency points, wherein if the difference between the simulated value and the interpolated value of a first point in the first group exceeds a bound, an additional frequency point is added to the second group, the additional point lying between the same pair of frequency points in said second group as the first point;

iteratively repeating the interpolating and comparing until the difference between the simulated value and the interpolated value of each point in the first group do not exceeds the bound; and

determining the response of the circuit for frequency points not in the subset from the interpolated response.

68. The method of claim 67, wherein the circuit is a sub-circuit representation of a MOSFET.

69. A computer readable storage device embodying a program of instructions executable by a computer to perform a method of simulating the dependence of non-linear device performance upon factor variations, said method comprising:

receiving a typical model of a sub-circuit representation of a non-linear device, the typical model dependent upon a plurality of model specific parameters;

receiving statistical distributions of a first set of simulation targets;

calibrating a statistical distribution of a selected set of model specific parameters with the first set of simulation targets using the typical model; and

generating a statistical distribution of a selected second set of simulation targets from the calibrated statistical distributions using the typical model.

70. The computer readable storage device of claim 69 further comprising generating a corner model subsequent to the generating of a statistical distribution

71. A method for transmitting a program of instructions executable by a computer to perform a process of simulating the dependence of non-linear device performance upon factor variations, said method comprising:

providing a typical model of a sub-circuit representation of a non-linear device, the typical model dependent upon a plurality of model specific parameters;

supplying statistical distributions of a first set of simulation targets;

calibrating a statistical distribution of a selected set of model specific parameters with the first set of simulation targets using the typical model; and

generating a statistical distribution of a selected second set of simulation targets from the calibrated statistical distributions using the typical model.

72. The method of claim 71, wherein the process further comprising generating a corner model subsequent to the generating of a statistical distribution.